OXY-GASOLINE CUTTING TORCH

The Need

In October 1996,a demonstration was completed to verify that the oxy gasoline cutting torch technology is a safe, reliable design that cuts faster and cleaner than the widely-used acetylene torch. A significant aspect of the Fernald cleanup mission is facilities decontamination and dismantling, which includes the segmentation of piping, thick-walled equipment, vessels and the like. This demonstration project set out to find a better method to segment these materials and enhance the overall D&D effort. Plant 1 was selected because it was the next major former production building targeted for demolition, and the timing of D&D activities already in progress there coincided with the needs of this demonstration.

Cutting through thick metal with an acetylene torch is a time-consuming process complicated by a tendency for molten metal from the resulting "rough" cut to flow back together and refuse. While the oxy-gasoline technology has been around for more than 40 years, it is not well known nor as widely used as the acetylene torch. One reason is the negative perception that use of gasoline is unsafe due to a potential for back flash, which could cause an explosion.

Figure 4. Oxy-Gasoline Torch Cutting, Petrogen International, Ltd.

The Technology

The oxy-gasoline torch system consists of a three-gallon fuel tank (American Society of Mechanical Engineers coded) equipped with an automatic flow cut-off valve and pressure release valve, an extremely durable gasoline supply hose and a cutting torch. Oxygen is supplied from conventional bottles. The entire system has been Underwriter's Laboratory (UL) approved.

The design of the cutting torch allows gasoline delivery to the tip of the torch in the form of a confined liquid. The expansion of the gasoline from a liquid to vapor, and the mixing of oxygen, occurs in the tip. This eliminates back flash down the fuel line and keeps the torch head cool.

The Demonstration

The oxy-gasoline torch was compared side-by-side with the acetylene torch. Both were used on the same thick-walled equipment, vessels and shield walls. Approximately 300 inches were cut by each torch, with thickness ranging from 1/2 inch to 4.5 inches.

Results

When cutting thick metal with the acetylene torch, the molten metal/slag was not totally removed from the cut. This resulted in re-solidification and the need to go back over the initial cut and cut again. This type of re bonding did not occur with the oxy-gasoline torch. The oxy-gasoline torch cut thick metal significantly faster and cleaner than the acetylene torch. The oxy-gas torch took 13 minutes to cut a two-inch thick steel plate. It took 27 minutes to make the same length of cut using an acetylene torch.

From a labor savings comparison, the economic value of the oxy-gasoline technology is evident. However, while the oxy-gas torch system costs about $500 more than an acetylene system, significant fuel cost savings also are associated with the oxy-gas torch. When cutting thick steel, 2 1/2 gallons of gasoline (about $3 worth) lasted all day. It takes a $32 bottle of acetylene to last as long. The three-gallon gasoline tank also is easier to handle, move around, and set up than an acetylene bottle.

This demonstration is significant because oxy-gasoline torch cutting can expedite the building dismantling effort and enhance worker safety at Fernald and at other DOE sites nationwide.

Representatives from the D&D subcontractor working on Plant 1 at the time of this demonstration were so impressed with the oxy-gasoline torch performance during the vendor training/briefing, that they purchased one of their own for use on a thick-walled storage tank even before the demonstration was completed.